The Descent of Science : How Quantum Mechanics is Shedding Light on the Interaction of Light and Matter(International & Interdisciplinary Symposium on What is Evolution? Bicentennial of Charles Darwin's Birth)

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free network of the textbook is characterized by the formation of the long-lasting communities, which plays a crucial role in enhancing the learning efficiency. The results are compared with those of random textbooks and also the dictionary. Finally we present a simple mathematical model of textbook growth that produces a long-lasting giant community structure.

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Darwin's original postulate states that each species of life descended from a primordial form through the process he called natural selection. As with life, scientific ideas evolved over time to forge new scientific theories. Many theories were superseded. Examples include the theory of "luminiferous aether", the "plum pudding" and other early models of the atom. Scientific ideas continue to evolve to explain and predict the behavior of nature. Only theories that are not disproved by the empirical method survive, to point the way to descendant theories that can enhance our understanding of the world and predict new phenomena.

I will give a brief introduction to one of the theories that derived from early atomic models, Quantum Mechanics, the theory that helps us understand the behavior of matter and light at a small scale. I will then show how experiments and calculations that use the principles of quantum mechanics, performed by the Atomic, Molecular and Optical Sciences (AMOS) Group at the Lawrence Berkeley National Laboratory, are shedding light on the mechanisms by which molecules dissociate into fragments after absorption of an X-ray photon. I will describe surprising findings in the particular case of carbon dioxide, and how a detailed study of this case led to a deeper understanding of the interaction between light and matter. Finally, I will discuss the following questions: Are the measurements and computations done by the AMOS Group leading to the extinction of a theory that has been used for decades in molecular spectroscopy? Will a certain kind of experiments become extinct as a consequence of these findings?